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Rongshan Yu

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CROCKETT & CROCKETT, P.C.
26020 ACERO
SUITE 200
MISSION VIEJO, CA 92691

EXAMINER

KIM, HEE-YONG

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/575,409	Applicant(s) YU ET AL.	
	Examiner HEE-YONG KIM	Art Unit 2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11-16, 18-23, 26-29 and 31-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11, 14-16, 18-23, 26-29 and 31-34 is/are rejected.
- 7) ☒ Claim(s) 12 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/6/2011</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated May 11, 2011.
2. **Claims 1, 11, 15-16, 18, 23, 26, 28 and 29** have been amended.
3. **Claims 9-10 and 24-25** have been cancelled.
4. **Claims 33 and 34** have been added.
5. **Claims 1-8, 11-16, 18-23, 26-29, and 31-34** are pending.

Response to Arguments

6. Applicant's arguments with respect to the prior art rejection over **claims 1-8, 11-16, 18-23, 26-29, and 31-34** have been considered but they are not persuasive.
7. Regarding independent **claim 1, 15-16, 18, 28-29, 33 and 34**, applicant argues (pp.16-20) that Li and Geiger and Oshikiri fail to disclose wherein at least the following information is determined as the perceptual information of the digital signal by the perceptual model: the bitplane of the error signal which the bitplane coding of the error signal starts M(s). Examiner respectfully disagrees. Oshikiri discloses wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the error signal (MDCT coefficient quantizer from Perceptual Masking, Fig. 17) and Li discloses the bitplane of the error signal which the bitplane coding of the error signal starts M(s) (coding Most Significant bits plane of all coefficient first, par.91). Examiner maintains that even though Li does not disclose the coding of an error signal explicitly, Lee teaches that bitplane coding is used for scalable

Art Unit: 2482

coding of signal by transmitting in the order of perceptible significance of the remaining signal from MSB to LSB (Fig.6), in order to be scalable by truncating the bits in the decoder side (paragraph 79). Therefore, given this teaching, it was obvious to the ordinary person in the art that the error signal (enhanced layer signal) is encoded by bitplane coding, in order for the enhanced layer signal to be further scalable by truncating the bits in the decoder side or on the transmission.

Claim Objections

8. **Claims 1, 29, 33 and 34** are objected to because of the following informalities.

Claims 1 and 29 recite "...wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the bitplane of the error signal which the bitplane coding of the error signal starts M(s)".

At first, there is a grammatical error since there is no multiple components corresponding to the phrase "at least one of the following information". Secondly, even though the specification discloses M(s), the claim itself is not clear what M(s) means. For the prosecution of the application, M(s) is considered as the maximum bitplane of the frequency band s in the light of specification.

Claims 33 and 34 recite "...which the bitplane coding of the error signal starts M(s)". Even though the specification discloses M(s), the claim itself is not clear what M(s) means. For the prosecution of the application, M(s) is considered as the maximum bitplane of the frequency band s in the light of specification.

Art Unit: 2482

9. **Claims 31 and 32** are objected to because they are dependent on the cancelled claims.

Claim 31 depends on the cancelled claim 10 and claim 32 depends on the cancelled claim 25. For the prosecution of the application, Examiner assumes that claim 31 depends on claim 1 and claim 32 depends on claim 18.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 1-11, 14-16, 18-29, 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Geiger (IEEE Proceedings of ICASSP, 2002) in view of Oshikiri (US 2005/0,252,361) and further in view of Li (US 2003/0,187,634), hereafter referenced as Geiger and Oshikiri and Li respectively.

Regarding **claim 1**, Geiger discloses INTMDCT – A Link between Perceptual and Lossless Coding. Specifically Geiger discloses A method for encoding a digital signal into a scalable bitstream (Fig.4 Perceptible Audio Coding Scheme and Scalable Lossless Enhancement) comprising:
quantizing the digital signal (Quantization in Encoder, Fig.4), and encoding the quantized signal(Encoding of Bitstream in Encoder, Fig.4) to form a corelayer bitstream

Art Unit: 2482

(Base Layer Coder, pp.1815, 2 lines below Chapter 7.1);

performing an error mapping (Subtraction, encoder in Fig.4) based on the digital signal and the corelayer bitstream to remove information (Subtraction, encoder in Fig.4) that has been encoded into the corelayer bitstream, resulting in an error signal (difference, pp.1815, line 6 below chapter 7.1).

However, Geiger fails to disclose bitplane coding the error signal based on perceptual information of the digital signal, resulting in an enhancement layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model; multiplexing the corelayer bitstream and the enhancement layer bitstream, thereby generating the scalable bitstream; wherein the error signal is represented in bitplanes comprising a plurality of bitplane symbols, and wherein the bitplanes are shifted based on the perceptual information of the digital signal, such that bitplane symbols of the bitplanes which are more perceptually important are coded first when the bitplanes are scanned and coded in a consecutive sequence during bit plane of the error signal; wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the bitplane of the error signal which the bitplane coding of the error signal starts $M(s)$.

In the analogous field of endeavor, Oshikiri discloses Sound Encoding Apparatus and Sound Encoding Method. Specifically Oshikiri discloses multiplexing (Multiplexer, 109, Fig.3) the corelayer bitstream (output of Base Layer Coder 102, Fig.3) and the enhancement layer bitstream (output of Enhancement Layer Coder 108, Fig.3), thereby generating the scalable bitstream; coding the error signal (Output of Subtractor 106,

Art Unit: 2482

Fig.15) based on perceptual information of the digital signal (MDCT coefficient quantizer from Perceptual Masking, Fig. 17), resulting in an enhancement layer bitstream (Output of Enhancement Layer Coder 1302, Fig.15), wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the error signal (MDCT coefficient quantizer from Perceptual Masking, Fig. 17) .

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Geiger by specially providing coding the error signal based on perceptual information of the digital signal, resulting in an enhancement layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model, in order to compress the enhancement layer audio by quantizing the signal only exceeding the perceptual masking.

However, Geiger and Oshikiri still fail to disclose bitplane coding of the error signal and wherein the error signal is represented in bitplanes comprising a plurality of bitplane symbols, and wherein the bitplanes are shifted based on the perceptual information of the digital signal, such that bitplane symbols of the bitplanes which are more perceptually important are coded first when the bitplanes are scanned and coded in a consecutive sequence during bitplane of the error signal and the bitplane of the error signal which the bitplane coding of the error signal starts $M(s)$.

In the analogous field of endeavor, Li discloses System and Method for Embedded Audio Coding with Implicit Auditory Masking. Li specifically discloses biplane coding (bitplane coding, Fig.6) based on auditory (perceptual) masking (Fig.6) and

Art Unit: 2482

wherein the error signal is represented in bitplanes (bitplane coding 630, fig.6) comprising a plurality of bitplane symbols (group of bits of the same significance, paragraph 91), and wherein the bitplanes are shifted based on the perceptual information of the digital signal, such that bitplane symbols of the bitplanes which are more perceptually important are coded first (optimal coding order is determined that coefficient having a great impact on perceived sound quality earlier than have a lesser impact, paragraph 85) when the bitplanes are scanned and coded in a consecutive sequence during bit plane of the error signal and the bitplane of the signal wherein the bitplane coding of the signal starts M(s) (coding Most Significant bits plane of all coefficient first, par.91), in order to be scalable by truncating the bits in the decoder side (paragraph 79). Examiner maintains that even though Li does not disclose the coding of an error signal explicitly, Lee teaches that bitplane coding is used for scalable coding of signal by transmitting in the order of perceptible significance of the remaining signal from MSB to LSB (Fig.6), in order to be scalable by truncating the bits in the decoder side (paragraph 79). Therefore, bitplane coding can be applied to enhanced layer (error signal), in order to be further scalable.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Geiger and Oshikiri by specially providing bitplane coding of the error signal (enhanced layer signal) based on auditory masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, in order for the enhanced layer signal to be further scalable by truncating the bits in the decoder side or on the transmission. The

Art Unit: 2482

Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, has all the features of claim 1.

Regarding **claim 2**, Geiger and Oshikiri and Li disclose everything claimed as applied above (see claim 1). In addition, Geiger discloses further comprising: transforming the digital signal (MDCT, Fig.4) into a suitable domain (DCT domain), wherein the transformed signal is quantized (Quantization and Coding in Encoder, Fig.4) to form the quantized signal before encoding the quantized signal.

Regarding **claim 3**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 1, discloses wherein the perceptual information of the digital signal is further multiplexed (Oshikiri: multiplexer, Fig.3) with the corelayer bitstream and the enhancement layer bitstream to generate the scalable bitstream.

Regarding **claim 4**, Geiger and Oshikiri and Li disclose everything claimed as applied above (see claim 2). In addition, Geiger discloses wherein the digital signal is transformed to a transformed digital signal using an integer Modified Discrete Cosine Transform (MDCT can be replaced by IMDCT, both appear in Fig.4).

Regarding **claim 5**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 4, discloses wherein the transformed signal is normalized (Oshikiri: normalizing, paragraph 168) to approximate the output of a MDCT filterbank (spectrum divided into bands, paragraph 126)

Regarding **claim 6**, Geiger and Oshikiri and Li disclose everything claimed as applied above (see claim 1). In addition, Geiger discloses wherein the digital signal or the transformed digital signal is quantized and encoded according to the Moving Pictures Expert Group (MPEG) Advanced Audio Coding (AAC) specification (MPEG-2 Advanced Audio Coding (AAC), pp.1813, line 5 below chapter 1).

Regarding **claim 7**, Geiger and Oshikiri and Li disclose everything claimed as applied above (see claim 1). Geiger discloses that the quantized value is subtracted (subtractor at encoder, Fig.4) to get the enhanced layer signal (error signal). However, Geiger and Oshikiri and Li fail to disclose wherein the quantized value is the lower quantization threshold corresponding to each quantized value of the quantized signal from the digital signal or the transformed digital signal.

However, it was well-known in the art that the quantized value represents a range between lower and higher quantization value spanned by quantization level. Therefore, it would have been obvious to map the quantized value among a finite set

Art Unit: 2482

which could be a higher quantization threshold and lower quantization threshold and mid-value, in order to present quantized value.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Geiger and Oshikiri and Li by specially providing wherein the quantized value is the lower quantization threshold corresponding to each quantized value of the quantized signal from the digital signal or the transformed digital signal, in order to present quantized value. The Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding based on perceptual masking, and further incorporating mapping the quantized value as the lower quantization threshold corresponding to each quantized value of the quantized signal, has all the features of claim 7.

Regarding **claim 8**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 1, discloses wherein the psychoacoustic model (Oshikiri: cannot be heard by human auditory sense, paragraph 121) is used as the perceptual model (Oshikiri: perceptual masking, paragraph 121) for determining the perceptual information of the digital signal.

Regarding **claim 11**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of

Art Unit: 2482

enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 9, discloses wherein at least the following information is determined as the perceptual information of the digital signal by the perceptual model:

the Just Noticeable Distortion (JND) level of the digital signal (Li: JND, paragraph 52), wherein s correspond to a frequency band of the digital signal (Li: critical band k, paragraph 53) or the transformed digital signal (Li: masking threshold for transformed coefficients, paragraph 84) .

Regarding **claim 14**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 11, discloses wherein the bitplane of the error signal which the bitplane coding of the error signal starts (Li: coding order, paragraph 12) is determined from the quantization step size (Coding order is based on masking threshold which is determined by energy in each bit plane, quantized by quantization step size) used in the frequency band s for quantizing the digital signal or the transformed signal (Li: transform coefficients, Paragraph 18).

Regarding **claim 15**, the claimed invention is a system claim corresponding to the method claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 16**, the claimed invention is a computer readable claim corresponding to the method claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claims 18-23 and 26-29**, the claimed inventions are decoding method or system corresponding to the encoding method or system, claims 1-8 and 11-16. Therefore, they are obvious by same references by doing inverse of encoding.

Regarding **claim 18**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 1, discloses A method for decoding a scalable bitstream into a digital signal (Geiger: Decoder, Fig.4) comprising:

demultiplexing (Oshikiri: Demultiplexor, Fig.8) the scalable bitstream into a corelayer bitstream (Oshikiri: input to Base Layer decoder 602, Fig.8) and an enhancement layer bitstream (Oshikiri: input to Enhancement Layer Decoder 604, Fig.8) ;

decoding (Geiger: Decoding of bitstream, Fig.4) and dequantizing (Inverse

Quantization, Fig.4) the corelayer bitstream to generate a corelayer signal;

bitplane decoding (Inverse of Li: Bitplane encoding using masking thresholds,

paragraph 84) the enhancement layer bitstream based on perceptual information of the digital signal; and

performing an error mapping (Geiger: Adder input from Enhancement Layer at Decoder,

Art Unit: 2482

Fig.4) based on the bitplane decoded enhancement layer bitstream and the dequantized (Geiger: Inverse Quantization, Fig.4) corelayer signal (Geiger: Adder input from Perceptually coded Base Layer at Decoder, Fig.4), resulting in a reconstructed transformed signal (Geiger: lossless output, Fig.4), wherein the reconstructed transformed signal is the digital signal;

wherein the enhancement layer bitstream is bitplane decoded (Inverse of Li: Bitplane encoding using masking thresholds, paragraph 84, reverse transform, paragraph 72) to generate a plurality of bitplanes (Li: Equation 5 shows L bitplanes) comprising a plurality of bitplane symbols (Li: group of bits of the same significance, paragraph 91) in a consecutive sequence, and the bitplanes are shifted (Li: optimal coding order is determined that coefficient having a great impact on perceived sound quality earlier than have a lesser impact, paragraph 85) based on the perceptual information of the digital signal to generate the bitplane decoded enhancement layer bitstream;

wherein at least the following information is received as the perceptual information of the digital signal: the bit-plane which corresponds to the enhancement-layer bitstream (incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal) when the bit-plane decoding of the enhancement- layer bitstream further starts, which bit-plane is specified by a number M(s) (Li: coding Most Significant bits plane of all coefficient first, par.91).

Regarding **claim 19**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal

Art Unit: 2482

based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses further transforming (Geiger: Inverse IntMDCT, Fig.4) the reconstructed transformed signal into a reconstructed signal, wherein the reconstructed signal is the digital signal.

Regarding **claim 20**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses wherein the perceptual information of the digital signal is obtained from the demultiplexing (Oshikiri: Demultiplexor, Fig.8) of the scalable bitstream.

Regarding **claim 21**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 19, discloses wherein the corelayer signal (Geiger: MDCT, Fig.4, can be replaced with IntMDCT) and the enhancement layer signal (Geiger: IntMDCT, Fig.4) are transformed using an integer Modified Discrete Cosine Transform (MDCT).

Regarding **claim 22**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of

Art Unit: 2482

enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses wherein the corelayer bitstream is decoded and dequantized according to the Moving Pictures Expert Group (MPEG) Advanced Audio Coding (AAC) specification (MPEG-2 AAC, line 2 below chapter 7.4).

Regarding **claim 23**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses wherein the error mapping is performed by adding (Geiger: adder at decoder, Fig.4) the signal used for dequantizing (Geiger: Inverse Quantization, Fig.4) the transformed signal and the bitplane decoded enhancement layer bitstream (Inverse of Li: Bitplane encoding using masking thresholds, paragraph 84), thereby generating the enhancement layer signal (Geiger: lossless audio, Fig.4). However, it fails to disclose wherein the lower quantization threshold used for dequantizing the transformed signal.

However, it was well-known in the art that the quantized value represents a range between lower and higher quantization value spanned by quantization level. Therefore, it would have been obvious to map the quantized value among a finite set which could be a higher quantization threshold and lower quantization threshold and mid-value, in order to present quantized value.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Geiger and Oshikiri and Li by specially providing wherein the lower quantization threshold is used for dequantizing the transformed signal, in order to present quantized value. The Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding based on perceptual masking, and further incorporating mapping the quantized value as the lower quantization threshold, has all the features of claim 23.

Regarding **claim 26**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses wherein at least the following information is received as the perceptual information (Li: audio file using masking threshold, paragraph 76) of the digital signal: the Just Noticeable Distortion (JND) level (Li: JND, paragraph 52), of the digital signal, wherein s correspond to a frequency band (Li: critical band k, paragraph 53) of the digital signal.

Regarding **claim 27**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane

Art Unit: 2482

coding of the error signal starts MSB in the critical band, as applied to claim 26, discloses wherein the bitplane which corresponds to the enhancement layer bitstream when the bitplane decoding of the enhancement layer bitstream starts $M(s)$ (Li: coding order, paragraph 12) is determined from the quantization step size (Coding order is based on masking threshold which is determined by energy in each bit plane, quantized by quantization step size) used in the frequency band s for dequantizing the corelayer bitstream (Same quantizer used in corelayer (AAC) can be applied to enhanced layer).

Regarding **claim 28**, the claimed invention is a system claim corresponding to the method claim 18. Therefore, it is rejected for the same reason as claim 18.

Regarding **claim 29**, the claimed invention is a computer readable claim corresponding to the method claim 18. Therefore, it is rejected for the same reason as claim 18.

Regarding **claim 31**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 10, discloses wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the bitplane of the error signal (Geiger: Subtraction MDCT from init MDCT, encoder in Fig.4)) which the bitplane coding of the error signal starts $M(s)$; and the Just Noticeable Distortion (JND) level of the digital signal (Li: JND, paragraph 52), wherein s

Art Unit: 2482

correspond to a frequency band of the digital signal (Li: critical band k, paragraph 53) or the transformed digital signal (Li: masking threshold for transformed coefficients, paragraph 84) .

Regarding **claim 32**, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 18, discloses wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model: the bitplane of the error signal (Geiger: Subtraction MDCT from init MDCT , encoder in Fig.4)) which the bitplane coding of the error signal starts M(s); and the Just Noticeable Distortion (JND) level of the digital signal (Li: JND, paragraph 52), wherein s correspond to a frequency band of the digital signal (Li: critical band k, paragraph 53) or the transformed digital signal (Li: masking threshold for transformed coefficients, paragraph 84) .

Regarding **claim 33**, the claim is substantially close to claim 1. The only difference is “wherein the error signal is represented in bit-planes comprising a plurality of bit-plane symbols, and wherein the bit-planes and the bit-plane symbols are scanned and coded during bit-plane coding of the error signal in a sequence based on the perceptual information of the digital signal, such that bit-plane symbols of the bit- planes which are more perceptually important are coded first;”.

Art Unit: 2482

However, the Geiger scaled audio coding, incorporating the Oshikiri multiplexing base and enhancement layer bitstreams, and perceptual coding of enhancement layer, further incorporating the Li bitplane coding of enhanced signal based on perceptual masking and the bitplane of the error signal wherein the bitplane coding of the error signal starts MSB in the critical band, as applied to claim 1, discloses wherein the error signal is represented in bit-planes comprising a plurality of bit-plane symbols (Li: bitplane coding, Fig.6), and wherein the bit-planes and the bit-plane symbols are scanned and coded (Li: top bitplanes are first encoded, par.85) during bit-plane coding of the error signal in a sequence based on the perceptual information (Li: Calculate Auditory Masking 640, Fig.6) of the digital signal, such that bit-plane symbols of the bit-planes which are more perceptually important are coded first (Li: optimal coding order is determined that coefficient having a great impact on perceived sound quality earlier than have a lesser impact, paragraph 85).

Regarding **claim 34**, the claim is a decoder corresponding to the encoder claim 33. Since decoder is the inverse of encoder, Therefore, it was obvious over the encoder which was taught by the combination of Geiger and Oshikiri and Li.

Allowable Subject Matter

12. **Claims 12 and 13** would be allowable if rewritten to include all of the limitations of the base claim 1 and intervening claims 11 (for claim12), and of the base claim 1 and intervening claims 11 and 12 (for claim13).

Dependent **claim 12** recites "...subtracting the bitplane of the error signal corresponding to the JND level of the digital signal from the bitplane of the error signal which the bitplane coding of the error signal starts $M(s)$, thereby determining the perceptual significance $P_s(s)$, wherein the perceptual significance $P_s(s)$ is used to control the scanning and coding sequence of at least the bitplanes or the bitplane symbols of the bitplanes..." which are features that are not anticipated nor obvious over the art of record. Dependent **claim 13** recites "...defining a common perceptual significance $P_s(s)_{\text{common}}$ based on a function of the perceptual significance $P_s(s)$; and subtracting the common perceptual significance $P_s(s)_{\text{common}}$ from the perceptual significance $P_s(s)$, thereby generating the normalized perceptual significance $P'_s(s)$, wherein for frequency band s for which the quantized values are not all zero, the value of the perceptual significance $P_s(s)$ is set to the value of the common perceptual significance P_s common, and herein for frequency band s for which the quantized values are all zero, the normalized perceptual significance $P'_s(s)$ is multiplexed with the corelayer bitstream and the enhancement layer bitstream to generate the scalable bitstream" which are features that are not anticipated nor obvious over the art of record. Accordingly, if the claims are amended as indicated above, and if rejected claims 1-8,

Art Unit: 2482

11, 14-16, 18-23, 26-29, and 31-34 are cancelled, the application would be placed in condition for allowance.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on 571-272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2482

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/HEE-YONG KIM/
Examiner, Art Unit 2482

/CHRISTOPHER S KELLEY/
Supervisory Patent Examiner, Art
Unit 2482